

EUROPEAN VLBI NETWORK – TECHNICAL & OPERATIONS GROUP

26th June 2015 – Robledo, Spain

Report on VLBI Operations for Jodrell Bank Observatory

1. October/November 2014 Session

The October/November 2014 EVN session for JBO consisted of 23 experiments: 4 at 5cm, 10 at 6cm and 9 at 18cm and used both the Lovell and Mk2 telescopes. There were no joint e-MERLIN experiments in this session. At 5cm, 18h of observations were performed on the Mk2 telescope with a reported data loss (due to Mk5 recorder problems) of only 28m (2.6%). At 6cm, a total of 80h were scheduled (66h on the Lovell and 14 on the Mk2). The remnants of Hurricane Gonzalo hitting the UK in October led to several days of disruption to observations, resulting in 15h50m (19.8%) of observing time being lost, all of it on the Lovell telescope. This effected parts of experiments ep088g and er030e and all of global experiment gj014. At 18cm, a total of 73.5h were scheduled on the Lovell telescope. The 18cm receiver installed on the Lovell telescope prior to the 18cm EVN session failed just prior to observations commencing. A replacement receiver was fitted in record time resulting in the loss of 1h of user observations at 1h of fringe tests. The total data loss was therefore 2h (2.7%). In conclusion, a total of 171.5h of telescope time was scheduled (32h on the Mk2 telescope and 139.5h on the Lovell telescope) with a total reported data loss at the telescope of 18h18m (10.7%), i.e. a success rate of 89.3% (dominated by the losses due to high winds).

2. February/March 2015 Session

The February/March 2015 EVN session for JBO consisted of 24 experiments: 7 at 18/21cm, 9 at 6cm and 8 at 5cm and were scheduled to use both the Lovell and Mk2 telescopes. This was significantly smaller than normal EVN sessions entirely due to a lower than normal disk availability within the EVN. No experiments were joint e-MERLIN observations also two were EVN re-runs of previously observed joint e-MERLIN projects. At L-band, 71h of observations were performed with the Lovell telescope and there was no reported data loss. At C-band, 70h of observations were performed (46h using the Lovell telescope and 24h using the Mk2 telescope). A small amount of data was lost (20m) due to disk recording problems. This amounted to less than 0.5% of the C-band time. At M-band, 77h of observations were scheduled on the Mk2 telescope with a reported data loss of 1h10m (1.5%) due to problems with the OTCX antenna control computer. In conclusion, a total of 218h of telescope time was scheduled (101h on the Mk2 telescope and 117h on the Lovell telescope) with a total reported data loss at the telescope of 1h30m (0.7%), i.e. a success rate of 99.3%.

3. May/June 2015 Session

The May/June 2015 EVN session for JBO consisted of 22 experiments: 10 at 6cm and 12 at 18/21cm using both the Mk2 and Lovell telescopes. This was smaller than usual JBO commitments because the EVN also observed a significant portion of the session at Q and X-bands. There were no joint e-MERLIN experiments. At C-band a total of 98.5h of observations were performed (26h using the Lovell telescope and 72.5 using the Mk2 telescope). Several experiments were affected by high winds resulting in a total of 7h25m (7.5%) of data being lost. At L-band a total of 96h of observations were performed, all with the Lovell telescope. One complete experiment (eo013) was lost due to the failure of a firmware upgrade to allow wide-band sub-bands on the DBBC. This resulted in 12h (12.5%) being lost. In conclusion, a total of 194.5h of telescope time was scheduled (122h on the Lovell telescope and 72.5h on the Mk2 telescope) with a total reported data loss at the telescope of 19h25m (10%), i.e. a success rate of 90%.

4. Technical Developments

Normal operations have run relatively smoothly over the last six months. The DBBC has been tested on multiple occasions with mark5-606 with ftp tests, and the recordings made of Network Monitoring Experiments in March have past preliminary checks although they need further processing. From Session II 2015 JBO is now permanently operating with the DBBC unit. To allow eVLBI with our other Mark5 unit we have installed a dual port adapter which only runs under newer Linux, which in turn only supports the latest SDK. A dual-boot system allows switching between the old and new SDK. The 'Wheezy/sdk9.4' software has been installed without obvious problems. We have ordered the 'Core2' boards for the DBBC to allow future 2Gbps recording tests and operations. It will require a Mark5 upgrade to 5B+ which is an Amazon card plus VSI interface. We are also

considering decommissioning the Mk4 and VLBA racks around the time of the JBO control building refurbishment in 2016. In the long term that may make dual-telescope phase-referencing difficult. There is likely to be a renewed effort on the e-MERLIN data path now that the system is relatively stable, and because we share a requirement with the pulsars group for the data path. The plan is to combine these two operations. More test observations will be performed soon. The spectrum-recording command for the FS is now fully functioning. Each VLBI experiment now automatically stores a copy of the observing band spectrum on the local server (newton.ast.man.ac.uk under 'experiment spectra'). A stabilised cal diode has been installed on the Mk2 telescope for 6cm observations. We are currently building a further two 32TB disk packs.

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